Amendments to the Claims

This listing of claims replaces all previous listing of claims in the application.

Listing of claims:

1. (cancelled)
2. (cancelled)
3. (cancelled)
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31. (cancelled)

32. (cancelled)

33. (cancelled)

34. (cancelled)

35. (cancelled)

36. (cancelled)

37. (previously presented)   A system for estimating data transmitted by a plurality of transmit elements across a communications channel, comprising:

a) a plurality of receive interfaces, each receive interface operative to receive a signal via the communications channel and output a respective sequence of received data elements;

b) a space matched filter connected to said plurality of receive interfaces and operative to:

i) assemble the received data elements into sets of received data elements, each said set of received data elements including at least one received data element from each sequence of received data elements; and

ii) jointly process each set of received data elements with each of a plurality of channel data elements to produce a corresponding plurality of filtered data elements, each filtered data element being associated with one of the transmit elements, each channel data element being representative of a portion of the communications channel between an associated one of the transmit elements and said plurality of receive interfaces; and

c) a detector connected to said space matched filter and operative to process each filtered data element to produce a corresponding decision data set, the decision data set for each filtered data element includes a soft decision data set comprising a set of values, each value in the set of values being indicative of a likelihood or reliability associated with transmission of a

corresponding symbol by the transmit element associated with the particular filtered data element and where the likelihood or reliability includes an a posteriori probability computed at least partly on the basis of:

    iii) the particular data element;

    iv) the corresponding symbol; and

    v) a plurality of correlation data elements, each correlation data element being representative of a relationship between the channel data element associated with the transmit element associated with the particular filtered data element and a corresponding one of the channel data elements associated with a different one of the transmit elements.

38. (previously presented)   The system defined in claim 37, wherein each receive interface comprises a respective receive antenna.

39. (previously presented)   The system defined in claim 37, wherein said space matched filter being operative to jointly process each set of received data elements with each of a plurality of channel data elements to produce a corresponding plurality of filtered data elements includes said space matched filter being operative to perform a linear combination of the received data elements in the set of received data elements to produce each of the filtered data elements.

40. (previously presented)   The system defined in claim 39, wherein the number of filtered data elements produced from each set of received data elements equals the number of transmit elements.

41. (previously presented)   The system defined in claim 37, wherein the decision data set for a particular filtered data element includes a hard decision data set for the particular filtered data element.

42. (previously presented)   The system defined in claim 37, wherein said space matched filter is further operative to obtain the channel data elements from an external source.

43. (previously presented)   The system defined in claim 37, wherein said space matched filter is further operative to compute the channel data elements based on measurements of the communications channel.

44. (previously presented)   A system for estimating data transmitted by a plurality of transmit elements across a communications channel, comprising:

a) a plurality of receive interfaces, each receive interface operative to receive a signal via the communications channel and output a respective sequence of received data elements;

b) a space matched filter connected to said plurality of receive interfaces and operative to:

   i) assemble the received data elements into sets of received data elements, each said set of received data elements including at least one received data element from each sequence of received data elements; and

   ii) jointly process each set of received data elements with each of a plurality of channel data elements to produce a corresponding plurality of filtered data elements, each filtered data element being associated with one of the transmit elements, each channel data element being representative of a portion of the communications channel between an associated one of the transmit elements and said plurality of receive interfaces;

c) a detector connected to said space matched filter and operative to process each filtered data element to produce a corresponding decision data set therefore;

d) a multiplexer connected to said detector for combining multiple decision data sets for filtered data elements associated with different ones of the transmit elements into a single sequence of decision data sets; and

e) a decoder connected to said multiplexer, said decoder being operative to produce a set of information symbols for each decision data set in the sequence of decision data sets; said decoder being further operative to compute statistical properties of the transmitted data, wherein said detector being operative to process each filtered data element to produce a corresponding decision data set therefor includes said detector being operative to (iii) compute statistical properties of the communications channel on the basis of the statistical properties of the

transmitted symbols received from said decoder and (iv) process each filtered data element on the basis of the statistical properties of the communications channel.

45. (previously presented)   The system defined in claim 44, wherein each receive interface comprises a respective receive antenna.

46. (previously presented)   The system defined in claim 44, wherein said space matched filter being operative to jointly process each set of received data elements with each of a plurality of channel data elements to produce a corresponding plurality of filtered data elements includes said space matched filter being operative to perform a linear combination of the received data elements in the set of received data elements to produce each of the filtered data elements.

48. (previously presented)   The system defined in claim 46, wherein the number of filtered data elements produced from each set of received data elements equals the number of transmit elements.

49. (previously presented)   The system defined in claim 44, wherein the decision data set for a particular filtered data element includes a hard decision data set for the particular filtered data element.

50. (previously presented)   The system defined in claim 44, further comprising a de-mapper connected to said multiplexer, said de-mapper being operative to produce a soft representation for each decision data set in the sequence of decision data sets.

51. (previously presented)   The system defined in claim 50, wherein said de-mapper being operative to produce a soft representation for each decision data set in the sequence of decision data sets includes said de-mapper being operative to assign, to a particular data set, a numerical value corresponding to a sum of symbol values weighted by the contents of the particular data set.

52. (previously presented)   The system defined in claim 51, wherein the symbol values correspond to numerical representations of respective points in a constellation.

53. (previously presented)   The system defined in claim 50, further comprising a decoder connected to said de-mapper, said decoder being operative to transform the soft representations provided by said de-mapper into a stream information symbols.

54. (previously presented)   The system defined in claim 53, wherein said decoder is an error correction decoder.

55. (previously presented)   The system defined in claim 53, wherein said decoder is selected from the group consisting of a turbo decoder, a Reed-Solomon decoder, a convolutional decoder and a block decoder.

56. (previously presented)   The system defined in claim 53, said decoder being further operative to generate reliability values on the information symbols, wherein said de-mapper being operative to produce a soft representation for each decision data set in the sequence of decision data sets includes said de-mapper being operative to produce said soft representation at least partly on the basis of the reliability values from said decoder.

57. (previously presented)   The system defined in claim 44, wherein said decoder being operative to produce a set of information symbols for each decision data set in the sequence of decision data sets includes said decoder being operative to select one of a predetermined set of information symbols on the basis of the contents of the particular data set.

58. (previously presented)   The system defined in claim 57, wherein each set of information symbols in the predetermined set of information symbols corresponds to a respective point in a constellation.

59. (previously presented)   The system defined in claim 44, wherein said space matched filter is further operative to obtain the channel data elements from an external source.

60. (previously presented)   The system defined in claim 44, wherein said space matched filter is further operative to compute the channel data elements based on measurements of the communications channel.

61. (previously presented)   The system of claim 56, further comprising an interference reducing filter disposed between said space matched filter and said detector.

62. (previously presented)   The system of claim 61, wherein the interference reducing filter comprises a minimum mean square error (MMSE) filter.